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ABSTRACT
The paper proposes a rational reconstruction of Fleeming Jenkin's 1868 analysis of wage determination in labour markets characterised by the presence of trade unions. Jenkin intended to show that the supply and demand theory of market price determination did not support the thesis sustained by the opponents of trade unions that the latter are unable to permanently achieve a market-clearing wage higher than that which would be obtained in their absence. Starting with a definition of "demand" and "supply" of a given commodity as functions of a few economic variables, Jenkin elaborated a fresh critique of the wages fund theory and highlighted the impact of trade unions on both supply and demand for labour.

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1. Introduction

The years between the mid-1860s and early-1870s were characterised by a heated public debate in Great Britain concerning the role and impact of trade unions on the functioning of labour markets (Biagini 1987). The main facts are as follows. In 1865–1866 the so-called Sheffield Outrages occurred in which trade unionists were accused of using arson and murder to intimidate non-unionist workers and employers. Following the uproar caused by the Sheffield Outrages in 1867, a Royal Commission on Trade Unions was set up (Pelling 1963 [1992], Chapter IV). In 1866, Longe's essay was published. The essay criticised the then mainstream theory of wage determination, the wages fund theory, as expounded by John Stuart Mill in his *Principles of Political Economy*, Book II, Chap. XI, "Of Wages." In the *Fortnightly Review* in October of the same year, William Thomas Thornton published a series of articles on the theory of supply and demand and the wage rate that culminated in his book *On Labour* (1869, 2nd ed. 1870) that, famously, prompted Mill's (1869) recantation of the wages fund theory.[1] Two years later, in 1871, the seventh and final edition of

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[1] On William T. Thornton, see Donoghue (2016). As is well-known, Mill's (1869) recantation of the wages fund theory has given rise to an extensive literature: see Breit (1967), Ekelund (1976, 1985), West and Hafer (1978, 1981), Ekelund and Kordsmeier (1981), Negishi (1985, 1986), Forget (1991), White (1994), Donoghue (1997a), Sotiropoulos and Economakis (2008) and Stirati (2020).

Mill's *Principles* appeared. In the Preface the author drew his readers' attention to contemporary debates on the supply and demand theory and the influence of strikes and trade unions on wage determination. Yet, he claimed that these debates had not yet generated consolidated results such as to be incorporated into a general treatise. In the same year, William Stanley Jevons published the first edition of his *The Theory of Political Economy*. In the preface, Jevons wrote that some of the "generally accepted doctrines" are to be regarded as "purely delusive." In particular, he mentioned the wages fund theory which, in his view, is based on a mere truism, "namely, that the average rate of wages is found by dividing the whole amount appropriated to the payment of wages by the number of those among whom it is divided." (Jevons 1871, vi). Finally, in 1871, the British Parliament passed the Trade Union Act whereby trade unions were finally granted full legal status.

Henry Charles Fleeming Jenkin intervened in the debate concerning trade unions and wage theory in two contributions. The first, "Trade Unions: How far Legitimate," *The North British Review* (1868), is subsequent to both Longe's pamphlet and Thornton's articles in the *Fortnightly Review* but antedates Thornton's (1869) book and Mill's (1869) recantation of the wages fund theory. The second, "The Graphic representation of the laws of supply and demand, and their application to labour," *Recess Studies* (1870), is subsequent to the works by Thornton and Mill.[2]

The attention of interpreters has generally focused on the first part, "Graphic representation of the laws of supply and demand," pp. 151 - 170, of Jenkin (1870) in which supply and demand curves appear for the first time in British economic literature (Brownlie and Lloyd Prichard 1963, 211; Humphrey 1992, 14). By contrast, Jenkin (1868) and the second part of Jenkin (1870), "Application of the laws of demand and supply to the special problem of wages," pp. 171 - 185, have so far received less attention. Donoghue (1997b) attempts to fill the gap in the literature regarding Jenkin's contribution to the debate concerning the wages fund theory and the role of trade unions. Donoghue claims that in the 1868 essay Jenkin's aim was to demonstrate "the deleterious effects of the trade union movement in Britain … [Jenkin] related it to an inability on the part of trade unions to increase the wage fund (destined to workers) and thus the average wage rate (assuming a constant work force)" (Donoghue 1997b, 93). In particular, for Donoghue, Jenkin disputed the most important claim made by trade unionists, that is, that the wage rise that occurred in England was the outcome of their action (see Donoghue 1997b, 93–94). By contrast, according to Donoghue, in his subsequent 1870 essay, Jenkin examined the relation between trade unions and workers" average wage and modified "his earlier ideas describing the inability of unions to raise the "wages of men" (Donoghue 1997b, 102).

The purpose of this paper is to develop a rational reconstruction of Jenkin's 1868 contribution to the debate concerning the wages fund theory and the role of trade

[2] Jenkin (1870) mentioned both works. Perhaps bitterly disappointed by a lack of citation, Jenkin pointed out that in his 1868 essay he had anticipated the thesis, which was later advocated by Thornton and accepted by John Stuart Mill, concerning the fallacy of the wages fund theory in its rigid version, whereby the wages fund is assumed as given and constant (Jenkin 1870, 172). Be what it may, Longe (1866, 27 and 38 ff.) had already advanced the argument that the wages fund cannot be taken as given, since there is not a given sum of money "earmarked" for wage payment.

unions. The interpretation of Jenkin (1868) proposed in this paper may be summarised as follows. Jenkin's aim in the first part of his 1868 essay was to show that the "principles of political economy," particularly the supply and demand theory, do not support the thesis advanced by the opponents of the trade unions that the latter are unable to achieve a market-clearing wage permanently higher than that which would obtain in their absence. The innovative element of Jenkin's contribution consists in his definition of "demand" and "supply" of a given commodity as continuous functions of a few economic variables, namely the "desire to buy," the "readiness to sell" and the commodity's market price, and not as given points in the price-quantity plane. This definition allowed Jenkin to distinguish between movements along a given supply or demand curve from shifts of the respective curves in the price-quantity plane. With reference to the functioning of the labour market, Jenkin analysed one of the most socially relevant themes of his times, wage bargaining between unionised workers and employers, by means of a supply and demand theory of wage determination.

The interpretation of Jenkin (1868) proposed in this paper is different from that proposed by Donoghue (1997b). The latter ascribes to Jenkin the opinion actually held by the opponents of the trade unions. By contrast, Jenkin, in the opening paragraphs of his 1868 essay, objectively reviewed the various positions confronting each other in the public debate of the time without taking an explicit position in favour of one or the other. Moreover, Donoghue (1997b) underestimates the role of supply and demand theory in Jenkin (1968) when he claims that the latter "also tentatively outlined a concept of supply and demand (incorporating differences between commodity price determination and wage determination in the labour market). These ideas were further developed and formalised in [Jenkin's] 1870 article" (Donoghue 1997b, 93). Conversely, as detailed *infra*, Jenkin (1868) developed quite a sophisticated formalisation of the supply and demand theory in order to show that, through the action of trade unions, workers may achieve a market-clearing wage *permanently* higher than that they would obtain in the absence of trade unions. Accordingly, Donoghue's conclusion about a change in Jenkin's position between the 1868 and 1870 essays is to be rejected.

2. The debate on trade unions before Jenkin (1868)

According to the commonly accepted version of the wages fund theory, the latter is basically an application of the supply and demand theory to labour markets: market competition among workers and employers ensures that, on average, market wage is determined by the relationship between the demand for labour (the wage fund) and the supply of labour (the number of available workers). Hence, market wage's dynamics depends on the relative changes in the wages fund and the working population (Senior 1836, Mill 1848, McCulloch 1868, see Stirati 1998, 2016).[3] The position of

[3] As is well-known, also Marx (1865 [1898]) was one of the key participants in the wages fund debate; but a detailed treatment of Marx's thought on this issue goes beyond the limits of this paper. As noted by one referee, the concept of "demand for labour" may turn out to be ambiguous since, in the history of economic thought, it has assumed different meanings: a) Smith and Ricardo by "demand for labour" meant the number of workers that firms want to hire, b) wages fund theorists considered it as a given amount of money to pay

economists such as McCulloch, who were both supporters of the wages fund theory and sympathetic towards the possibility for workers to legally establish trade unions, must be seen in this light. For McCulloch, in fact, combinations among workers can play a useful role if the market wage is initially "unduly depressed" below the "natural and proper" rate of wages determined by a "fair and free" market competition since, in such circumstances, the action of trade unions can speed up the process of convergence of the market wage to its free market-competition level. In any event, McCulloch argued that competition among employers would have led to an increase in the market wage; but he conceded that, in the absence of workers' combinations, this convergence process would have been slower. For McCulloch, the action of workers' combinations becomes completely useless or even detrimental to workers' interests if trade unions organise a strike to obtain a wage rate higher than the free market-competition level. In such circumstances, employers will refuse to grant the requested wage increase and, being richer than the striking workers, can hold out longer. Moreover, whenever in a given sector the wage demanded by trade unions is higher than the free market-competition wage, some workers will have an incentive to defect from the collusive agreement, i.e., to break the strike, while workers from other sectors or other industrial districts will be called upon by employers to replace those on strike. Finally, trade unions' demand for high wages encourages the process of substitution of machines for human labour. For all these reasons, McCulloch maintained that a combination among workers aimed at obtaining a higher than free market-competition wage is doomed to certain defeat. Therefore, McCulloch concluded, trade unions cannot determine a market wage which is permanently higher than the free market-competition wage (McCulloch 1868, Chapter VII on the Combination Laws repealed in 1824; see also McCulloch's articles on the same subject in the *Scotsman*, 26 July 1823, and *Edinburgh Review*, January 1824. On McCulloch and trade unions see O'Brien 1970, Chapter XIV).

It should be emphasised that the above argument rests on the implicit assumption that the wages fund is of a predetermined size, established prior to the wage bargaining phase between workers and employers. Hence, the wages fund cannot be increased through wage bargaining. Given this assumption, it follows that trade unions can *permanently* raise the market wage *only* by limiting the labour supply (i.e., through stricter apprenticeship rules). Trade unions may *temporarily* achieve a higher market wage through, say, a strike. Yet, since higher wages entail lower profits, the funds saved by entrepreneurs for paying aggregate wages will necessarily shrink. Therefore, given labour supply, the market wage will inevitably fall.[4]

wages, thus implying an inverse unitary elasticity between real wages and labour employment, and finally c) neoclassical economists formalized the demand for labour as a well-behaved decreasing function of the real wage, based on substitutability in production and/or consumption. As shown infra, Jenkin's formalization of labour supply and demand functions heralds the neoclassical theory of the functioning of a competitive labour market. By contrast, Classical economists had an entirely different wages theory, based on a variety of historical and socio-economic factors, in which well-behaved demand and supply functions for labour had no role to play (see Garegnani 1983, 1984, 1987).

[4] As remarked by Henry Sidgwick in an 1879 article in the *Fortnightly Review*, "The Wages-Fund Theory," the sharpest proponents of the wages fund theory did not deny that the wage fund could be increased in various ways e.g., by increases in labour productivity. What they denied was that the wage fund could be increased through successful wage bargaining of workers with employers (see Gordon 1973, 22).

As shown below, Jenkin (1868) based his critique of the wages fund theory on the rejection of the assumption that successful wage bargaining led by trade unions is unable to modify the wages fund.

3. Jenkin's 1868 critique of the wages fund theory

In his 1868 essay, Jenkin analysed various topics related to the status and role of trade unions. In what follows we focus only on the first issue tackled by Jenkin, i.e., the economic theory concerning the efficacy of trade unions in the labour market.

Jenkin began his analysis of the effects of trade unions on the labour market by reviewing the arguments for and against trade unions discussed in an article in *The Quarterly Review*.[5] In the *Quarterly Review* article cited by Jenkin, the debate between trade unions' spokesmen and their opponents concerned the explanation of an empirical fact: the rise of real wages in the years since the development and consolidation of trade unions. The bone of contention was whether or not a causal link between the birth and consolidation of trade unions and the rise in real wages could be established. The opponents of trade unions argued that what was at stake was a mere temporal coincidence; but no truly causal relationship was involved. According to trade unions' opponents, the increase in real wages was caused by a prolonged period of high profits that resulted in a growth rate of the wages fund that exceeded the growth rate of the working population. Hence, for trade unions' opponents, the rise in real wages would have occurred *spontaneously* through ordinary market competition mechanisms, even in the absence of trade unions. Such a position was clearly inspired by the wages fund theory:

> wages depend simply on the ratio between the capital employed as wages and the number of persons to be paid; and unless by augmenting the capital or by diminishing the number, in other words, by augmenting the demand or diminishing the supply, no permanent alteration in wages can be effected. (Jenkin 1868, 2–3)

Moreover, the opponents of trade unions set out to show that any action by trade unions is not only pointless but may turn out to be positively harmful whenever it reduces entrepreneurial profits and drives entrepreneurs to move their capital elsewhere (see Jenkin 1868, 3). Jenkin summarised the typical employers' response to demands for higher wages made by union leaders as follows:

> The stock answer is, "My poor fellows, do not delude yourselves; the wages fund depends on the profits of capital; if profits are large the fund may increase, but everything tending to diminish the profits diminishes the wages fund, so if you or some of you for a little while get increased wages, diminishing our profits, the fund to be divided among you next year will be smaller; and so, however much we may regret it, you will infallibly get less than you do now; what you are now getting is the market price of your labour—*the laws of political economy say so*." (Jenkin 1868, 6, emphasis added)

[5] Unfortunately, Jenkin did not specify which *Quarterly Review* article he was referring to. One plausible candidate is the First Report by the Commissioners appointed to inquire into the Organization and Rules of Trade Unions and other Associations, together with the Minutes of Evidence, vol. 122, 1867.

By contrast, trade unions' spokespersons did establish a causal link: in their view the rise in real wages would *not* have happened but for trade unions' hard bargaining with employers. Aware of the fact that the mainstream economic theory of wage determination, the wages fund theory, denied the existence of such a causal link, trade unions' spokespersons accused the economic theory of being unfounded:

> Let us now hear what men in unions claim to have accomplished, what objects they avow, and how they answer the accusations against them. As to wages, the men say:— "We *have* raised wages; if political economy says that this is impossible, so much the worse for political economy; we know that unions do raise wages, and our employers know it, and this is one reason why they are hostile to unions … " (Jenkin 1868, 4, Jenkin's emphasis)

From the statement above, it appears that the two sides in the debate supported two incompatible explanations of market wage determination: the wages fund theory *versus* a crude version of bargaining theory. The former had the sanction of accepted economic theory, the latter did not. Jenkin's views on this issue may be summarised thus: the opponents of trade unions claimed that the accepted principles of political economy, i.e., the wages fund theory and the supply and demand theory, demonstrate the irrelevance, at best, and the danger, at worst, of trade unions. For Jenkin, such a claim must be rejected since it is based on a defective understanding of economic theory: "the principles of political economy, though often quoted, are little understood" (Jenkin 1868, 2). In his view, in fact, a correct formulation of the supply and demand theory makes it possible to support the claim that trade unions may be able to determine a market wage permanently higher than that which would be obtained without them. To achieve his goal, the first step taken by Jenkin was to critically examine the shortcomings of the wages fund theory as a theory of wage determination and reconsider its alleged relationship to the supply and demand theory:

> The one argument in favour of permitting combinations of workmen to bargain with their employers is that these combinations do enable men to make a more advantageous bargain with the capitalist. […] Let us, then, examine closely the arguments in favour of the proposition dinned daily into our ears, that no combination of workmen or of masters can alter the rate of wages. These arguments take two forms, different in wording, but the same in essence, and are enounced as the doctrine of the Wages Fund, and the Law of Demand and Supply. (Jenkin 1868, 5)

To understand Jenkin's 1868 critique of the wages fund theory, it is useful to recall that one of its assumptions is that the wages fund is financed *uniquely* by entrepreneurs' savings out of their profits. Thus, a reduction in aggregate profits caused by a trade union-driven wage rise leads to a reduction in the growth rate of the wages fund. Given the growth rate of the working population, the market wage will inevitably fall. Jenkin granted that a trade union-driven wage rise entails a reduction in profits; but he denied that a reduction of profits necessarily entails a reduction of the wages fund. Jenkin's criticism of the wages fund theory aims to show that the wages fund *cannot* be taken as given in the wage bargaining phase since entrepreneurs' savings are *not* a constant magnitude:

> *The fallacy lies in the premiss that everything which diminishes profits diminishes the wages fund, or the saving which the capitalist applies to the purchase of labour*. Of course

> the tendency in that direction must be admitted, but the motion of a body is not determined by one force only; to deduce its motion by calculation from the forces in action, we must take all the forces into account, all the tendencies; and we venture to say that *in a large number of cases diminished profits on capital may cause an increase in the saving applied to the purposes of production*. (Jenkin 1868, 6, emphasis added)

According to Jenkin, there are two categories of capitalists who react to a reduction of profits with an increase of savings: (i) those who produce in sectors characterised by a high fixed-to-circulating capital ratio and (ii) those who save in order to accumulate financial capital and gain revenues from it.

Let us start with the former. Jenkin argued that, in order to avoid a strike and the blocking of production, entrepreneurs usually prefer to give in to trade unions' demands for higher wages, even if their revenues have not increased in the meantime. On the one hand, unless entrepreneurs lay off some of their workers as a result of the wage increase, their wage bill will increase and, given constant revenues, their profits will decrease. On the other hand, if entrepreneurs were to lay off some of their workers, they could keep their wage bill roughly constant; but they will be obliged to decrease production and, as a consequence, they will experience a reduction of revenues and profits. Therefore, entrepreneurs are called upon to choose the option that minimises their loss of profits. For Jenkin, since the total capital of an entrepreneur is equal to the sum of fixed and circulating capital, for those manufactures where circulating capital is but a negligible fraction of overall capital, the decision not to lay off workers leads to a negligible increase in the average variable cost but avoids a significant increase in the average fixed cost as it allows the quantity produced to remain constant. Thus, entrepreneurs succeed in avoiding a significant reduction of the profits-to-fixed cost ratio:[6]

> [Manufacturers'] gains do not represent the profits on the wages fund alone, but on the fixed capital as well. If they diminish the rate of production in their factory by investing a large portion of their gross annual receipts elsewhere, they greatly diminish the returns on their fixed capital, so much indeed as to outweigh any moderate advantage they can obtain by investing annual receipts more profitably. This consideration will often lead a manufacturer to continue his business with increased wages and diminished profits. […] A manufacturer will generally work his mill or factory to the utmost so long as he does obtain a profit; he does not voluntarily set aside a certain sum for wages, diminishing and increasing that sum according to profits, but he employs as many men as he can, and pays them what he must. (Jenkin 1868, 7)

Thus, for Jenkin, if at a given moment trade unions emerge triumphant from their fight for higher wages, this fact does not necessarily push entrepreneurs to substantially reduce labour employment. Provided that entrepreneurs still make positive profits, they may react to falling profits by reducing their personal consumption expenditures, while keeping labour employment nearly constant. In a nutshell, entrepreneurs may finance the increased total wage bill -brought about by a higher wage rate with nearly constant labour employment- through increased savings:

[6] Jenkin did not specify what he meant by fixed and circulating capital. From his examples, it appears that circulating capital is essentially the payroll, while by fixed capital he meant plant and machinery.

> There is a very considerable available sum in the hands of all solvent persons and manufacturers, used to provide against irregularities in receipts and payments. This fund in money, or in assets easily convertible into money, forms a kind of distributing reservoir, and might be called the reservoir fund. […] All money received by a manufacturer is first paid into the reservoir fund; from that fund it may pass into four distinct channels: it may be spent [for personal consumption], it may be invested in fixed capital unproductively, in fixed capital productively, or finally, in circulating capital out of which wages are paid. If the manufacture is profitable, the receipts paid into the reservoir fund continually exceed the sum returned into the circulating channel; an increase in the wages of the workmen increases the sum to be returned, and diminishes the sums flowing into the three other channels. […] *so long as trade is profitable, in order to pay increased wages [the manufacturer] need only divert out of the reservoir fund what, up to that time, he has habitually spent or consumed as income. Thus there is no material obstacle to an increase of wages, so long as any profit whatever is made by trade.* (Jenkin 1868, 9–10, emphasis added)

Jenkin recognised that, should profits fall below a certain threshold in a given sector, entrepreneurs might be induced to exit and carry their fixed capital elsewhere.[7] Therefore, Jenkin's argument strictly applies to those manufacturers where not only the ratio of fixed-to-circulating capital is high, but there are also significant exit costs (in modern terminology, those sectors where fixed capital cost is to a large extent a sunk cost):

> But, it may be urged, the argument as to a possible increase of the wages fund notwithstanding diminished profits, cannot hold good in those employments which require but little fixed capital. Undoubtedly the more easily capital can be transferred from one business to another, the sooner will any possible increase of wages fund applicable to that business reach its limit; but this same transfer of capital is by no means an easy matter, as any manufacturer or man of business will tell us (Jenkin 1868, 9)

A second category of capitalists who react to falling profits with an increase in their savings are financial capitalists, namely those "men who, not being manufacturers, save to invest money, with the object of obtaining an assured income as the reward of their saving" (Jenkin 1868, 8). For Jenkin, the saving behaviour of financial capitalists is relevant to the functioning of labour markets since savings made by financial capitalists contribute at least partially to the economy-wide wages fund. According to Jenkin, a reduction in the interest rate -as a result of a trade union-driven reduction of the profit rate- leads to an increase in savings (in modern terminology, Jenkin's argument implies that for net savers the income effect prevails over the substitution effect):

> Will these savings be increased or diminished as the rate of interest is high or low? On the one hand, a high rate of interest is a greater temptation to investment than a low one; but then with a low rate of interest a much larger sum must be invested to return a given income, and a given ideal income, of say £1000 per annum, is generally the object of investors of this class. Is it clear that the saving for investment in countries with a high average rate of interest, is greater in proportion to the incomes than in countries

[7] Unfortunately, Jenkin had no theory on the determination of the minimum rate of profits: "it is impossible to fix any one given rate of average return on capital which may be taken as a kind of standard towards which, in all times and places, the profits tend" (Jenkin 1868, 17).

> where a low rate of interest obtains? We doubt it extremely; indeed, *we entirely disbelieve that saving increases in proportion to the rate of interest to be obtained*. We do not believe that men determine if they can get 10 per cent. that they will invest £1000, but if they can only get 5 per cent. they will spend it. The contrary proposition is more nearly true: if men can get 10 per cent. for their money, they will consider they have made a sufficient provision for their family by investing £10,000; if they can only get 5 per cent. they feel compelled to invest £20,000 before retiring from business. (Jenkin 1868, 8, emphasis added)

It is not too harsh to claim that Jenkin was unable to provide an ironclad demonstration of his thesis that a reduction in aggregate profits does not necessarily imply a reduction in the aggregate savings that finance the economy-wide wages fund. As we have seen, the claim that a reduction in the interest rate leads to an increase in savings is not based on a rigorous analysis of individual savings decisions. Similarly, the "reservoir fund" argument implies the existence of different profit rates between sectors characterised by different ratios of fixed to circulating capital. Be what it may, the existence of these two categories of capitalists who react to a trade union-driven wage increase (and profit and interest rate decrease) by increasing their savings allowed Jenkin to conclude that *the wages fund cannot be taken as a magnitude which is independent of wage bargaining between workers and employers*. Therefore, in his view, the wages fund theory *cannot* determine the market wage for the very reason that the numerator of the ratio between the wages fund and the working population is indeterminate (see Jenkin 1868, 10).

Given the close link, acknowledged by Jenkin himself, between the wages fund theory and the supply and demand theory, the critique of the former induces Jenkin to a thorough rethinking of the latter. This is the subject of the following section.

4. Jenkin's innovative formalisation of the supply and demand theory

As recalled in footnote 3, Jenkin was not the first to raise the argument of the indeterminacy of the wages fund, since it can already be found in Longe (1866). What is innovative in Jenkin is the fact that he employed this argument to overturn the causal link between the wages fund and the market rate of wages established by the commonly accepted version of the wages fund theory. In the latter, the wages fund is an exogenous magnitude at a given moment and, as remarked in Section 2, its analytical role is the determination of the market wage, given the available workforce. By contrast, for Jenkin, the market wage is among the economic variables that determine the wages fund. Obviously, this implies that the market wage must be taken as given when the wages fund is determined. According to Jenkin, the market wage is determined, as much as any other market price, by the interplay of supply and demand. Hence, given the commonly accepted link between the wages fund theory and the supply and demand theory, the obvious next step in Jenkin's argument is a formalisation of the supply and demand theory that substantially qualifies the close relationship between the wages fund theory and the supply and demand theory:

> One class of economists believe they can give a definite rule by which the price of labour may be determined, or at least by which any permanent change in that price is regulated. This rule would, therefore, if true, allow us to calculate either the wages fund

> or the change in the wages fund due to altered circumstances. This rule they name the Law of Demand and Supply (Jenkin 1868, 10)

Jenkin located the crux of the matter in the fact that the words “supply” and “demand” are rife with ambiguity since they are commonly used to denote two radically different concepts (see Jenkin 1868, 11 ff). Sometimes, “supply” and “demand” refer to a specific quantity of a given commodity which is offered for sale and in demand, respectively, at a given time and place. In such a case, “supply” and “demand” can be measured by mere numbers, and thus the statement, say, “supply has decreased” simply means that a smaller quantity of a given commodity is brought to the market and is available for sale. As clarified in Section 2, supporters of the commonly accepted version of the wages fund theory used “supply and demand for labour” in this sense.

In other, and, for Jenkin, more interesting cases, “supply” and “demand” are synonymous for “readiness to sell” and “desire to buy” a given commodity, respectively. In this latter case, the words “supply” and “demand” embody an intrinsic relationship with the commodity’s market price which is wholly lacking in the former case. For Jenkin, in fact, if “supply” and “demand” are used in the sense of given quantities, their connection with the commodity’s market price is irremediably lost. By contrast, readiness to sell (desire to buy) indicates the willingness by those who own the commodity (those who wish to get the commodity) to sell (buy) a certain quantity of it *at a given market price*. Hence, the expression, say, “supply has decreased” must be understood in the sense that owners of a given commodity are willing to sell a given quantity of it at a higher market price or, equivalently, that they are willing to sell a smaller quantity of it at the same market price. As stressed by Jenkin, “no equality or ratio can be said to exist between the desire to buy and the readiness to sell” (Jenkin 1868, 12).

To avoid such semantic ambiguities, Jenkin claimed that “The equality between demand and supply means equality between the number demanded and the number supplied at a given price; and to signify these numbers we shall use these words, and not the words demand and supply” (*ibidem*). This remark should not be considered hair-splitting or pedantic as, for Jenkin, it is the dynamics of the readiness to sell and desire to buy and *not* market competition that determines the dynamics of the market-clearing price of a given commodity. In modern terminology, Jenkin’s argument may be restated by saying that market competition only explains market price dynamics whenever the market price of a given commodity accidentally diverges from the market-clearing price determined by the intersection of the market supply and demand curves of the commodity under scrutiny. As stressed by Jenkin, just as the weight of a body is not determined by the scale that measures it, neither does market competition determine the market-clearing price since market competition does not affect the ultimate determinants of the latter, i.e., the readiness to sell and the desire to buy (see Jenkin 1868, 14).

To provide a rigorous analysis of the mechanisms that determine the market-clearing price of a given commodity at a given moment and its dynamics, Jenkin introduced his fundamental analytical contribution. In a long footnote (Jenkin 1868, 13–14, fn 1), supply and demand of a given commodity are formalised as follows:

$$D = f(A + 1/x)$$
$$S = F(B + x)$$

D and *S* are the quantity demanded and the quantity supplied of a given commodity, respectively, *x* its market price, *A* a variable quantity measuring all factors besides the market price that influence buyers' purchasing decisions, and *B* a variable quantity measuring all factors besides the market price that influence owners' supply decisions. (In modern terminology, *A* and *B* are shift parameters of the demand and supply curves, respectively.)

Unfortunately, Jenkin did specify neither the functional form of *f* and *F* nor the variables that determine *A* and *B*. Moreover, he provided no detailed justification for the inverse (direct) relation between *D* (*S*) and *x*. As will be seen in the following section, these shortcomings makes his analysis of the impact of trade unions in the labour market difficult to interpret since, in his view, trade unions exert their effect both on workers' *B* and entrepreneurs' *A*. In particular, Jenkin did not detail how a variation in workers' *B* caused by trade unions' action determines a higher market-clearing wage but not an excess supply of labour. We may guess that higher market-clearing wages favour both a reduction of child labour (with a consequent increase of the schooling rate) and elderly labour (through earlier retirement).

For Jenkin, three scenarios must be kept neatly separated:

i. both the readiness to sell and the desire to buy do not vary,
ii. one of them varies while the other remains constant and
iii. both the readiness to sell and the desire to buy vary in the same direction or in different directions.

When both the readiness to sell and the desire to buy are given and constant, as is the case in the first scenario, the market-clearing price is that specific value of *x* such as the equation $f(A + 1/x) = F(B + x)$ holds true, "an equation in which, so long as *A* and *B* and *f* and *F* were all constant in value and form, *x* would remain constant, and would be fixed in terms of these magnitudes" (*ibidem*). If the market price of a given commodity happens to be above or below its market-clearing value, there will be a mismatch between the quantity supplied and the quantity demanded which causes the market price to change till it coincides with the market-clearing price as defined above.

With reference to the second scenario, Jenkin studied the effects on the market-clearing price of a change in the desire to buy, given the readiness to sell, or vice versa. Suppose the desire to buy (readiness to sell) increases, *ceteris paribus*. In this case, there is excess demand (excess supply) at the old market-clearing price and the market price will rise (fall) to its new market-clearing level (see Jenkin 1868, 14 fn 1).

Finally, Jenkin analysed the situation in which both the desire to buy and the readiness to sell vary. If they both increase, the market-clearing price may remain nearly constant while the quantity traded of the given commodity increases in equilibrium. By contrast, if the desire to buy increases while the readiness to sell decreases, the market-clearing price increases while the quantity traded of the given commodity may remain nearly constant in equilibrium:

> When the quantity demanded at a fixed price increases, A is increased. If B varies at the same time to a corresponding extent, we may have x the same as before, but a brisk trade instead of a slow one. If, on the other hand, B diminishes while A is constant, the price will rise while the number of transactions will become more limited, but if A rises while B falls, we may have a new and higher value of x, with a constant number of transactions; *this is the conclusion to which we especially wish to draw attention*. (*ibidem*, emphasis added)

In modern terminology, a rise in A and a contemporaneous fall in B imply a rightward shift of the demand curve and a leftward shift of the supply curve in the price-quantity plane. From the perspective of this paper, this scenario is the most interesting. As detailed in the following section, for Jenkin trade unions exert a significant impact on labour market outcomes by means of a direct and an indirect mechanism: they enable workers to reduce their readiness to sell their labour (direct mechanism) and push entrepreneurs to increase the amount of money earmarked to pay the wage bill (indirect mechanism). Thus, according to Jenkin, trade unions are able to determine a permanent increase in the market-clearing wage, often without any significant loss of labour employment. By claiming that trade unions are able to influence both labour supply, through a direct mechanism, and labour demand, through an indirect mechanism, Jenkin was able to substantiate his view that the thesis advanced by trade unions' opponents concerning trade unions' inability to permanently increase the market-clearing wage was based on a defective understanding of the principles of political economy.

5. Jenkin's assessment of the role of trade unions in wage determination

As remarked in Section 2, trade unions' opponents argued that, according to the accepted principles of political economy, trade unions could only lead to a permanent wage increase to the extent that they were able to reduce working population (labour supply) since trade unions were deemed unable to increase the wages fund (labour demand) in the wage bargaining stage. Such a conclusion was based on the implicit assumption that the expressions "labour supply" and "labour demand" refer to given quantities.

By contrast, Jenkin's original contribution consists in his formalisation of "labour supply" and "labour demand" as functions of a few economic magnitudes. Accordingly, if, following Jenkin, labour supply is understood as readiness to sell labour at a certain wage, then a permanent increase in the market-clearing wage may occur *not only* when a smaller number of workers is available in the labour market (as is the case according to the traditional version of the wages fund theory) *but also* when the available workforce reduces its readiness to sell its labour at a given wage. In modern terminology, a reduction of workers' readiness to sell their labour entails that the labour supply curve shifts leftward in the w-N plane. Market-clearing in the labour market is restored at a higher wage and a nearly constant labour employment, provided that the entrepreneurs' desire to buy labour increases at the same time. In modern terminology, an increase of entrepreneurs' desire to buy labour entails that the labour demand curve shifts rightward in the *w-N* plane:

> To apply this reasoning to labour: Wages, it is said, can only increase by an increase in the demand or by a decrease in the supply; and *decrease in the supply is always interpreted to mean decrease in the number of men in want of employment*. Now, an equivalent effect to that produced by a decrease in the number supplied is produced whenever a given number of men who were yesterday willing to work at 30s. per week are today unwilling to work at that price, and require 31s. instead of 30s. If while the readiness to sell labour is decreased the desire to purchase it does not increase, we allow that to re-establish equality between the number demanded and the number supplied, the number demanded or employed must fall as wages rise; but *if the diminished readiness to work be accompanied by an increased wish for labourers, wages may rise, and the number employed remain the same, though the demand and supply, as measured by the number demanded and supplied, would remain constant*. (Jenkin 1868, 15–16, emphasis added)

Even if the entrepreneurs' desire to buy labour were to remain constant, and thus even if a wage increase, due to workers' reduced readiness to sell their labour, should lead to a reduction in the level of employment, workers as a whole would still be better off. According to Jenkin, this happens when the wage increase is so significant that the workers who keep their job after the wage increase may subsidise those workers who have lost it because of the wage increase. Thanks to this subsidy, unemployed workers can withdraw from the labour market and thus stop bidding for the wages of those who keep their job:[8]

> A second effect which may follow, and perhaps most generally does follow, the unwillingness of men to work except at increased wages, is this: the number employed may actually diminish, and yet the desire for labour, as measured by the total fund spent for labour, may increase; so that the reduced number, with augmented wages, may receive more than the larger number at lower wages; in this case *it may be the interest of the workman to support his fellows out of work by a contribution from his gains, rather than, by a reduction in his own requirements, to allow them to find employment*. (Jenkin 1868, 16, emphasis added)

Hence, the crucial question is: how does a reduction in workers' readiness to sell their labour come about? This is where trade unions come into play. Workers' fees collected by the trade unions provide them with funds that can be used during the wage bargaining phase with the employers. Put differently, trade unions' funds change the set of options available to workers who decide to strike or otherwise refuse to work and thus

[8] As is well-known, the standard version of the wages fund theory implies that the real wage elasticity of labour demand is constant and equal to one in absolute value. Since the wages fund is fixed, workers who keep their job after a wage increase gain as a whole exactly what is lost by workers who lose their job. By contrast, if we follow Jenkin and reject the assumption that the wages fund is given and constant, then the situation faced by workers drastically changes. In fact, a wage increase reduces equilibrium employment but increases the overall wage bill. Hence, workers who keep their job after the wage increase earn as a whole more than what is lost by workers who lose their job, thus paving the way for a compensation scheme between the employed and the unemployed. If the subsidy induces the unemployed to retire from the labour market and thus if the unemployed do not exert a downward pressure on the market wage, the wage increase may become permanent. Jenkin's insight concerning the possibility for the employed to subsidise the unemployed can be used to explain certain phenomena that have historically characterised the labour market, e.g., the progressive reduction of children and elderly labour as rising household income has enabled adult workers to do without the economic contribution of their children and the elderly.

give up the opportunity of earning wages. When trade unions are absent, striking workers can only rely on their own financial resources and thus they are usually unable to conduct a long strike that would lead their families to bankruptcy and starvation. By contrast, in the presence of trade unions, striking workers can rely on trade unions' funds for support and thus, being able to strike for longer, they enjoy greater chances of entrepreneurs giving in to their requests of a wage increase:

> If it be granted that bargaining does affect wages, it will readily be allowed that an association with savings enables its members to bargain more advantageously than isolated workmen could do. If the alternative before the labourer is work at the wages offered or starvation, he will be much less resolute in his views as to his worth, than when the alternative lies between work at high wages and mere privation; and a large mass, acting in concert, finds support in the mutual approval of its members. Joint action also causes greater inconvenience to the capitalists, and forces them to make up their mind at one given time. This point requires no elaboration. Many persons think the unions ought not to be allowed to exercise the powers they possess, but few, if any, will deny that if wages can be altered by bargaining, unions can drive the harder bargain. (Jenkin 1868, 19)

Thanks to Jenkin's reformulation of supply and demand for labour in terms of functions of the price of labour, wages, and a few other magnitudes, wage bargaining between workers and entrepreneurs may be analysed by means of a supply and demand theory of wage determination. For Jenkin, the presence of trade unions in the labour market produces the effect of decreasing workers' readiness to sell their labour. The greater the number of unionised workers in a given sector, the less vibrant the competition among workers to find a job and thus the pressure on them to waive the request for a wage increase is lower:

> We have reasoned so far on the assumption that the workmen act as one body, as is sensibly the case where unions are strong. We have therefore neglected the effect of competition among workmen. Where competition can occur, it weakens the effect which an increased reluctance to sell their labour on the part of some workmen can produce in increasing the total desire for their work. The smaller the united body which refuses the low wages, the less their power; but whatever their size and importance, the tendency of their action remains the same. (Jenkin 1868, 16)

Up to this point, we have analysed only Jenkin's views on the ability of trade unions to permanently raise the market-clearing wage through their ability to influence workers' readiness to sell their labour. This is what in the previous section has been given the name of direct mechanism and concerns the supply side of the labour market. Yet, Jenkin was aware of the need to counter the following criticism to his argument. As highlighted in Section 2, those who denied an active role for trade unions in the rising trend of British wages explained the latter by referring to increased entrepreneurial profits: a prolonged period of high profits gave entrepreneurs an incentive to increase both production and labour demand. Accordingly, trade union opponents concluded, British wages would have increased even in the absence of trade unions.

To counter such an objection, Jenkin resorted to what in the previous section has been referred to as the indirect mechanism. The latter concerns the demand side of the labour market and consists in the entrepreneurs' enhanced desire to buy labour as a consequence of a trade union-driven wage increase. As highlighted in Section 3, for Jenkin there are two categories of capitalists who react to an increase in wages and a consequent reduction in the profit and interest rates with an increase in their savings out of profits. This is where Jenkin's indirect mechanism comes into play: (at least some) entrepreneurs react to a trade union-driven wage increase by increasing the amount of money devoted to pay the wage bill. According to Jenkin, in periods of normal profits, it is the action of trade unions that forces entrepreneurs to increase their wages fund or, in Jenkin's terminology, to increase their desire to buy labour by giving in to workers' demand for higher wages without significantly reducing labour employment. By the same token, for Jenkin, periods of high profits create the potential conditions for higher wages and increased labour employment; but it is the action of trade unions that turns such potentiality into actuality. When trade unions are absent, entrepreneurs increase their labour employment at a constant wage. Jenkin's view at this regard is worthy of a full quotation:

> It may here be argued that the increased desire or demand on the part of the masters would have given a rise of wages independently of any action on the part of the men; but *it by no means follows that without the diminished willingness to work on the part of the men the increased desire would ever have arisen*. The master builders of London want for their present work 2000 men. They are paying them 30s. a week; there may be no reason why they should want an increased number, and still less reason why *proprio motu* they should wish to give them 36s.; but let the men decline to work for less than 36s., the masters, if making a good profit, will still want 2000 men to do their work, and may therefore agree to advance the wages. *The demand, in the sense of desire for labour, may thus be said to have increased, but it has increased solely in consequence of the diminished willingness to sell.* […] An antagonist might still urge this argument: When trade is so good that masters can afford the advance of wages, they would naturally extend their business, and would want more hands; it is this potential increase in the number of hands wanted that really determines the increase of wages—not the refusal of the men to work for less than 36s. *This need not always or even generally be true, but even in this case the action of the men in demanding more wages determines a rise of wages instead of extension of employment*. (Jenkin 1868, 16, emphasis added)

To summarise Jenkin's argument, trade unions exert a direct influence on workers' readiness to sell their labour and an indirect influence on entrepreneurs' desire to buy labour. Through the combined action of these two mechanisms, trade unions are able to achieve a permanent increase of the market-clearing wage coupled with nearly constant labour employment in periods of normal profits and increased labour employment in periods of high profits.

6. Final remarks

Trained as an engineer, Jenkin is considered as "one of the intellectual giants of the Victorian period." Though he had a negligible impact on the main course of the development of economic analysis, he anticipated a few aspects of Jevons' and Marshall's value theory (see Brownlie and Lloyd Prichard 1963, 204 and 215). Unsurprisingly, interpreters have focused on this aspect of Jenkin's contribution to economics, somewhat neglecting his analysis of the impact of trade unions in the labour market. This paper has tried to fill this gap. We have developed a rational reconstruction of Jenkin's 1868 contribution to the debate concerning the wages fund theory and the role played by trade unions different from that proposed by other interpreters. We have argued that Jenkin (1868) intended to show that the "principles of political economy" did not support the argument advanced by the critics of trade unions. These critics claimed that trade unions, when they bargain with employers, cannot secure a market wage permanently higher than that which would be achieved in their absence. Jenkin achieved his goal by means of an innovative definition of "demand" and "supply" of a given commodity as functions of a few economic variables, namely the "desire to buy," the "readiness to sell" and the commodity's market price, and not as given points in the price-quantity plane. In particular, Jenkin identified two mechanisms through which trade unions influence the market wage: a direct mechanism when they enable workers to reduce their readiness to sell their labour and an indirect mechanism, when they push entrepreneurs to increase the amount of money devoted to pay the wage bill.

Jenkins' overall analysis is not exempt from logical defects. Yet, despite its shortcomings, Jenkin (1868) can be considered as an innovative contribution to the analysis of the functioning of labour markets in the interregnum between the decline of Classical economics and the rise to dominance of Neoclassical economics.

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